Remarks

The Office Action mailed March 20, 2008 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 22-25 and 40-47 are now pending in this application. Claims 1-21 and 26-39 have been canceled. Claims 22-25 and 40-47 stand rejected.

The rejection of Claims 40-43 under 35 U.S.C. § 101 as being directed to non-statutory subject matter is respectfully traversed.

Applicants have amended Claims 40-43 to recite a "computer readable medium encoded with a computer program" as suggested by the Examiner. Accordingly, Applicants submit that Claims 40-43 are directed to statutory subject matter.

For at least the reasons set forth above, Applicants respectfully request that the Section 101 rejection of Claims 40-43 be withdrawn.

The rejection of Claims 22, 40, and 44 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement is respectfully traversed.

Applicants respectfully traverse the assertion at page 3 of the Office Action that there is no support in the originally-filed specification for the limitation "seamlessly toggling between a volume rendering of the low-resolution image data and the analysis results of the high-resolution data within a single display." More specifically, Applicants respectfully submit that one of ordinary skill in the art would read at least paragraphs [0046]-[0048], and [0051], for example, as supporting the recitation "seamlessly toggling between a volume rendering of the low-resolution image data and the analysis results of the high-resolution data within a single display." However to expedite prosecution, Claim 22 has been amended to recite "seamlessly accessing the analysis results of the high-resolution image data from the displayed volume rendering of the low-resolution image data within a single display". As such, Applicants respectfully submit that Claim 22 satisfies the written description requirements under Section 112, first paragraph.

Claims 40 and 44 have been amended to include recitations similar to the recitation of Claim 22, as amended. As such, Applicants respectfully submit that Claims 40 and 44 satisfy the written description requirements under Section 112, first paragraph.

For at least the reasons set forth above, Applicants respectfully request that the Section 112, first paragraph, rejection of Claims 22, 40, and 44 be withdrawn.

The rejection of Claims 22-25 and 40-47 under 35 U.S.C. § 103(a) as being unpatentable over Hsieh et al. (U.S. Pat. No. 6,687,329) (hereinafter referred to as "Hsieh") in view of Uppaluri et al. (U.S. Pat. No. 7,295,691) (hereinafter referred to as "Uppaluri") is respectfully traversed.

Hsieh describes a method for acquiring subsequent image data in a medical diagnostic context based upon analysis of initial image data. The method includes acquiring (68) initial image data using an imaging modality (A). The imaging modality (A) has settings based on the physics of the modality (A) and may use a contrast agent or marker using data acquisition. An initial image (82) is formed (70) based on the acquired image data. With or without reconstructing the initial image (82), a computer aided diagnosis (CAD) algorithm is performed (72) on the initial image (82). Using the CAD analysis, a target region (86) within the initial image (82) is selected (74). The target region (86) may provide for greater spatial resolution of a potential lesion. Additional processing is optionally performed (76) to alter features (84) within the initial image (82), segmenting and/or calculating features (84) of interest, and/or select optimal parameters for reconstruction and/or additional image acquisition. More specifically, a subsequent or addition image (88, 92, 98) is generated (78) based on the selected optimal parameters using the same modality (A) or a different imaging modality (B and/or C). A subsequent image (88) may reprocess the target region (86) for a more detailed or analytical rendering of the target region (86) or a subsequent image (98) may increase spatial resolution of a region (100) having a feature (102) of interest. Some or all of the reconstructed images (82, 88, 92, 98) are presented (80) to physicians or radiologists.

Applicants respectfully traverse the assertions on page 4 of the Office Action that Hsieh describes "substituting high-resolution image data of the at least one feature of interest from the analyzed low resolution image data without operator intervention" and "displaying a volume rendering . . . of the low resolution image data and displaying analysis results of the high-resolution image data in a single display." Applicants further submit that Hsieh does not describe or suggest substituting high-resolution image data of at least one feature of interest for analyzed low-resolution image data without operator intervention; linking low-resolution data to high-resolution data; displaying a volume rendering of the low-resolution data; displaying analysis results of the high-resolution data; and seamlessly accessing analysis results of high-resolution image data from a displayed volume rendering of low-resolution image data within a single display. Rather, Applicants submit that Hsieh describes:

> [s]ubsequent processing, then, may be performed as summarized above to render a subsequent image 88 in which the target 86 is reprocessed, such as for more detailed or analytical rendering. Even within such regions, additional processing may be performed through similar steps to gain additional information on the features of interest. By way of example, in the diagram of FIG. 4, a particular feature 90 is reprocessed, such as through segmentation, to render a subsequent image 92 in which limits 94 of a core object 96 are identified. Additional further processing may be performed, such as indicated at reference numeral 98, to render additional images or image data, such as to further increase spatial resolution of a region 100 containing a feature 102 of interest. It should be noted that the various processing steps based upon sequential CAD analysis may be different from one another. Thus, through the *series of images 82, 88, 92 and 98* illustrated in FIG. 4, several different types of post-processing of the image data may be performed. (Column 9, lines 32-50) (emphasis added).
>
> [t]he additional processing at step 76 may also include automatic segmentation, calculation of sizes or volumes of features of interest, and so forth. The additional processing at step 76 may also include automatic selection of optimal parameters used in the reconstruction and produce additional images based on the optimal parameters. If such additional processing is desired, the processing is performed and *a*

> *subsequent or additional image data set may be generated* as indicated at step 78. *This image data set may be stored separately for display or review.* The image data set will differ from the original processed data by the subsequent processing programmed at step 76. Following a generation of the additional image at step 78, or if no additional processing is in order at step 76, the procedure advances to step 80 where some or all of the reconstructed images may be presented to physicians or radiologists. (Column 9, lines 1-16) (emphasis added).

Accordingly, Hsieh describes generating a subsequent or additional image, and storing the image separately for display or review. Hsieh does not describe or suggest that the addition image is substituted into the initial image or that seamlessly accessing analysis results of high-resolution image data from a displayed volume rendering of low-resolution image data within a single display.

Applicants submit that a description of generating and storing an additional image is not a description of linking low-resolution data to high-resolution data. Further, Applicants submit that a description of generating and storing an additional image is not a description of substituting high-resolution image data of at least one feature of interest for analyzed low-resolution image data without operator intervention. Moreover, Applicants submit that a description of generating and storing an additional image is not a description of seamlessly accessing analysis results of high-resolution image data from a displayed volume rendering of low-resolution image data within a single display. For at least these reasons, Applicants submit that Hsieh does not describe the present invention as claimed.

Furthermore, Applicants respectfully submit that Uppaluri does not make up for the deficiencies of Hsieh. Uppaluri describes a method for computer aided processing of an image set. The method includes acquiring (10) two successive X-ray images (216, 217), one (216) at a high energy and the other (217) at a low energy. The dual energy images (216, 217) are pre-processed (20) to scatter correct, noise reduce, and align the images. The pre-processed images (216, 217) are then decomposed (30) to generate a raw soft-tissue image (41) and a raw bone image (42). The raw soft-tissue and bone images (41, 42) are post-processed (40) to generate a processed soft-tissue image (46, 219) and a processed bone

image (47, 218). The images (216-219) form a dual energy image set (215). Within the image set (215), features are identified (230) and classified (240). Results (260) of the identification (230) and classification (240) may be displayed on each image (216-219) or be synthesized for display on one image (215). The results (260) are indicated using display markers, such as circles, squares, and/or arrows. More specifically, a first image, the high energy image (216) without the markers, is displayed and a second image, the high energy image (216) with the markers superimposed thereon, is displayed. The second image could be simultaneously displayed on a second hard- or sift-copy image display, or toggled with the other image via software on a soft-copy display.

As such, Uppaluri describes toggling between an image without markers and an image with markers, wherein the markers are shapes representing results of identification and classification of features. Uppaluri does not describe or suggest that the markers are of a higher resolution than the first or second image. Further, Uppaluri does not describe or suggest that one of the images is at a different resolution relative to any other image. Rather, Uppaluri describes high and low energy images and soft-tissue and bone images. As such, Uppaluri does not describes or suggest substituting high-resolution image data of at least one feature of interest for analyzed low-resolution image data without operator intervention; linking low-resolution data to high-resolution data; displaying a volume rendering of the low-resolution data; displaying analysis results of the high-resolution data; and seamlessly accessing analysis results of high-resolution image data from a displayed volume rendering of low-resolution image data within a single display.

Claim 22 recites a method for a seamless display and analysis of dual resolution image data, said method comprising "reviewing image data of an object at low-resolution . . . performing a volumetric analysis of at least one feature of interest in the low-resolution image data . . . substituting high-resolution image data of the at least one feature of interest for the analyzed low-resolution image data without operator intervention . . . analyzing the high-resolution image data . . . linking the low-resolution image data to the high-resolution image data . . . displaying a volume rendering of the low-resolution image data . . . displaying analysis results of the high-resolution image data . . . and seamlessly accessing the analysis

results of the high-resolution image data from the displayed volume rendering of the low-resolution image data within a single display."

Neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest a method as recited in Claim 22. More specifically, neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest a method including substituting high-resolution image data of at least one feature of interest for analyzed low-resolution image data without operator intervention. Further, neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest a method including linking low-resolution image data to high-resolution image data. Moreover, neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest a method including seamlessly accessing analysis results of high-resolution image data from a displayed volume rendering of low-resolution image data within a single display. Rather, Hsieh describes acquiring an initial image and then an additional image based on an analysis of the initial image, wherein the images may be stored and/or displayed, and Uppaluri describes using four dual energy images to generate result markers that may be toggled off and on a display of a high energy image.

Accordingly, for at least the reasons set forth above, Applicants submit that Claim 22 is patentable over Hsieh in view of Uppaluri.

Claims 23-25 depend directly from independent Claim 22. When the recitations of Claims 23-25 are considered in combination with the recitations of Claim 22, Applicants submit that Claims 23-25 likewise are patentable over Hsieh in view of Uppaluri.

Claim 40 recites a computer readable medium for acquiring medical image data, said computer readable medium encoded with a computer program configured to "receive low-resolution image data . . . perform a volumetric analysis of at least one feature of interest in the low-resolution image data . . . substitute high-resolution image data for analyzed low-resolution image data without operator intervention . . . analyze the high-resolution image data . . . link the low-resolution image data to the high-resolution image data . . . display a volume rendering of the low-resolution image data . . . display analysis results of the high-resolution image data . . . and seamlessly access the analysis results of the high-resolution

image data from the displayed volume rendering of the low-resolution image data within a single display."

Neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest a computer readable medium for acquiring medical image data as recited in Claim 40. More specifically, neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest a computer readable medium encoded with a computer program configured to substitute high-resolution image data for analyzed low-resolution image data without operator intervention. Further, neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest a computer readable medium encoded with a computer program configured to link low-resolution image data to high-resolution image data. Moreover, neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest a computer readable medium encoded with a computer program configured to seamlessly access analysis results of high-resolution image data from a displayed volume rendering of low-resolution image data within a single display. Rather, Hsieh describes acquiring an initial image and then an additional image based on an analysis of the initial image, wherein the images may be stored and/or displayed, and Uppaluri describes using four dual energy images to generate result markers that may be toggled off and on a display of a high energy image.

Accordingly, for at least the reasons set forth above, Applicants submit that Claim 40 is patentable over Hsieh in view of Uppaluri.

Claims 41-43 depend directly from independent Claim 40. When the recitations of Claims 41-43 are considered in combination with the recitations of Claim 40, Applicants submit that Claims 41-43 likewise are patentable over Hsieh in view of Uppaluri.

Claim 44 recites an imaging system comprising "a first image data acquisition system configured to acquire medical images . . . and a computer coupled to the image data acquisition system and configured to . . . receive low-resolution image data . . . perform a volumetric analysis of at least one feature of interest in the low-resolution image data . . . substitute high-resolution image data for the analyzed low-resolution image data without

operator intervention . . . analyze the high-resolution image data . . . link the low-resolution image data to the high-resolution image data . . . display a volume rendering of the low-resolution image data . . . display analysis results of the high-resolution image data . . . and seamlessly access the analysis results of the high-resolution image data from the displayed volume rendering of the low-resolution image data within a single display."

Neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest an imaging system as recited in Claim 44. More specifically, neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest an imaging system configured to substitute high-resolution image data for analyzed low-resolution image data without operator intervention. Further, neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest an imaging system configured to link low-resolution image data to high-resolution image data. Moreover, neither Hsieh nor Uppaluri, considered alone or in combination, describe or suggest an imaging system configured to seamlessly access analysis results of high-resolution image data from a displayed volume rendering of low-resolution image data within a single display. Rather, Hsieh describes acquiring an initial image and then an additional image based on an analysis of the initial image, wherein the images may be stored and/or displayed, and Uppaluri describes using four dual energy images to generate result markers that may be toggled off and on a display of a high energy image.

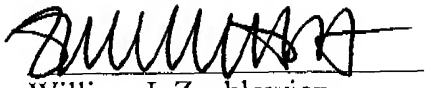
Accordingly, for at least the reasons set forth above, Applicants submit that Claim 44 is patentable over Hsieh in view of Uppaluri.

Claims 45-47 depend directly from independent Claim 44. When the recitations of Claims 45-47 are considered in combination with the recitations of Claim 44, Applicants submit that Claims 45-47 likewise are patentable over Hsieh in view of Uppaluri.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 22-25 and 40-47 be withdrawn.

In view of the foregoing amendment and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully submitted,



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